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(54) Title: END TRIMMING APPARATUS FOR VENETIAN BLINDS			
(57) Abstract			
<p>An apparatus for trimming the width of blinds of the type having a headrail, a bottom rail, and blind slats, and having a support body with a headrail opening, a bottom rail opening and blind slat opening, the blind components being insertable into their openings from one side of the support body, a die plate located alongside the support body, a headrail cutting recess, and a bottom rail cutting recess, and a blind slat cutting recess in the die plate, the die plate being moveable relative to the support body for cutting the blind components. Also disclosed are means for trimming the headrail and control rods of vertical blinds.</p>			

END TRIMMING APPARATUS FOR VENETIAN BLINDSTECHNICAL FIELD

The invention relates to an apparatus for cutting of the ends of a blind such as venetian blinds and vertical blinds.

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BACKGROUND ART

Venetian blinds are usually made on a custom basis corresponding to the width of a window.

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It would be desirable to manufacture venetian blinds in standard widths. A customer would provide the measurements of the window. The retail store would then trim the ends of the blind to the width desired by the customer. The system would mean that the blinds could be manufactured in larger production runs, thus reducing the cost. A blind consists of three main different components namely, a headrail or

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channel, a bottom rail and a set of blind slats, formed with a curved cross-section.

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End trimming operations could not be carried out by simple hand tools. Specialized tools were required for cutting each separate shape, of the headrail and the bottom rail and the slat ends. Workers had to be carefully trained so as to carry out the three separate cutting operations.

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It is desirable to provide an end cutting apparatus for cutting the sides of venetian blinds, in which all three components namely, the headrail, the bottom rail and the blind slats are all cut in a single apparatus.

Vertical blinds may also be trimmed by cutting one end of the headrail, and by cutting the control rods in the headrail.

DISCLOSURE OF THE INVENTION

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An apparatus for trimming the width of blinds of the type having a headrail, a plurality of blind slats, and a bottom rail and comprising, a support body, said body defining a headrail opening, blind slat opening means, and a bottom rail opening, respective said blind components being insertable into respective said openings from one side of said support body, a die plate means located on the other side of said support body, a headrail cutting recess in said

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die plate means, a bottom rail cutting recess in said die plate means, guide means on said support body for movably supporting said die plate means, said guide means defining a predetermined movement axis, whereby said die plate can move relative to said headrail and bottom rail openings in said support body between two positions, a first position in which said support body openings and said die plate cutting recesses are in alignment with one another, and a second position in which said cutting recesses are out of alignment with said openings, whereby the cutting of said headrail, and said bottom rail will take place in the same plane, and, means for moving said die plate means, between said two positions.

The headrail opening, and said bottom rail opening are aligned parallel to a common axis, and blind slat opening means may also be provided. The invention also provides that said axes are horizontal.

The die plate movement axis is substantially diagonal to the axes of the openings.

A blind slat cutter blade is mounted on the support body, and is movable to cut said blind slats.

The blind slat cutter blade defines a profile, similar to the shape of the blind slats.

An end stop engages the free ends of the blind components, to control the length of cut.

The various features of novelty which characterize the invention are pointed out with more particularity in the claims annexed to and forming a part of this disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective illustration of a blind cutting apparatus partially cut away;

Figure 1A is a perspective of a typical venetian blind;

Figure 2 is a side elevation of the apparatus of Figure 1, with movement shown in phantom;

Figure 3 is a section along the line 3-3 of Figure 6;

Figure 4 is an exploded perspective illustration of certain components of the cutting apparatus.

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Figure 5 is a perspective illustration corresponding to Figure 4 showing the parts assembled;

Figure 6 is a side elevation of Figures 4 and 5;

5 Figure 7 is a side elevation of a manual mechanism for operating ;

Figure 8 is a perspective of an end stop mechanism;

Figure 9 is a side view of another slat cutting drive linkage in one position;

Figure 10 is shows Figure 9, in another position;

10 Figure 11 is a side elevation of an alternate embodiment;

Figure 12 shows a further embodiment;

Figure 13 shows a further embodiment for vertical cutting;

15 Figure 14 is a section along line 14-14 of Figure 13;

Figure 15 is a schematic side elevation of a further embodiment, and ,

Figure 16 shows a vertical blind cutting modification.

MODES OF CARRYING OUT THE INVENTION

20 Referring generally to Figure 1, it will be seen that the invention is there illustrated in the form of a blind end trimming apparatus indicated generally as 10, suitable for trimming a venetian blind.

25 A venetian blind V is shown in Figure 1A and has a headrail H a bottom rail B and blind slats S.

The end trimming apparatus 10 has a base plate 12, and a main support body 14 attached to the plate 12 in a upright fashion normal to the plate 12.

30 The main support body 14 has a headrail opening 16, a bottom rail opening 18, and two blind slat openings 20-20, with a central partition 22.

35 The headrail opening, the blind slat openings, and the bottom rail opening, are aligned parallel side by side horizontally with one another, and are spaced in such a way that a blind, can be placed with their headrails, blind slats, and bottom rail in the appropriate openings.

The headrail opening 16 is of rectangular shape to correspond with the shape of a typical headrail.

The bottom rail opening is likewise shaped to receive a typical bottom rail.

5 Such apparatus could be made with interchangeable recesses, and dies and cutters so that it could be adapted to trim the ends of variety of different venetian blind designs, simply by interchanging certain components.

10 A complete blind consisting of headrail, slats, and bottom rail, may be received with their components in their respective openings. The blind slats can be arranged in bundles and slid through into the two openings provided.

HEADRAIL AND BOTTOM RAIL TRIMMING

15 The apparatus for trimming the headrail and the bottom rail consists of a die plate 30, which is slidably mounted on one side of the main support body 14 by means of lower guide 32 and upper guide 34.

20 The two guides are parallel to one another, and are spaced apart and extend along parallel diagonal axes at about 45°. The die plate 30 can slide within the guide rails along a diagonal upward and downward movement path. A central rectangular clearance opening 36 is provided in the die plate, registering with the slat openings 20 in the main body 14.

25 In order to cut the headrail, a headrail cutting recess 38 is provided in die plate 30. When the die plate is in one position, the cutting recess 38 lines up with the headrail opening 16 in the support body 14.

30 When the die plate 30 is moved into the other position, a cutting action takes place, and the opening and the recess are out of alignment.

The bottom rail cutting is effected by means of a bottom rail cutting recess 40 formed in die plate 30, in one position, and being out of alignment in another position.

35 Movement of the die plate 30 between one position and another position, will produce cutting or trimming of the ends of both the headrail and the bottom rail which may be

simultaneous, or almost at the same time, or in sequence depending upon the design (see below), and in the same plane.

Cutting pressure is applied to one corner of each of the headrail and the bottom rail, and cutting is thus progressive through the two components in a diagonal manner while the two components are held fixed substantially on edge.

Cutting of the two components could also take place in sequence. The bottom rail die recess 40 could be slightly oversize as at 40A in Figure 9, so that cutting of the bottom rail would take place just after cutting of the headrail.

The die plate 30 is formed with a rectangular recess 42 having a bottom edge 44, normal to the diagonal axis of the die plate, and two side edges 46-46. A top closure bar 48 closes off the rectangular recess 42 for reasons to be described below.

A rotary cam member 50 engages the bottom edge 44 of the recess 42, for movement of plate 30 in one direction, and closure bar 48 closing the recess 42, for movement in the other direction.

The two side edges 46 do not contact the rotary cam, but define clear spaces on either side to permit arcuate movement of cam 50.

The cam 50 is itself mounted eccentrically on a hub 52, which is rotatably mounted in the main body 14. Hub 52 extends outwardly from the main body 14 (Figure 1), and is provided with a manual operating lever 54.

The rotary axis of the cam 50 is offset relative to the rotary axis of the hub 52. When the hub 52 is rotated by the lever 54 in the direction indicated by the arrow A, the cam 50 will be forced against the lower edge 44 of the rectangular recess 42 in the die plate 30. This will force the die plate 30 to move on a downward diagonal axis, cutting both the headrail H and the bottom rail B of the blind. Releasing the handle 54 permits a spring (not shown) rotate the hub in the opposite direction.

TRIMMING OF BLIND SLATS

The trimming of the blind slats S is carried out separately from the trimming of the headrail and the bottom rail.

5 A blade mounting frame 60 is slidably mounted on main body 14, between main body 14 and the die plate 30. Main body 14 is formed with two guide grooves 62, and the blade mounting frame 60 is supplied with two guide bars 64, sliding in the grooves 62.

10 The blade mounting frame 60 is of rectangular shape and defines an interior space 66. At one end (right hand end of Figures 4 and 5) a blade 68 is mounted on the frame 60. The blade is a generally curved shape in end section, so as to provide a generally bevelled trim shape to the ends of the

15 blind slats S.

Generally curved blind slat supports 70 and 72 are provided on main body 14, and on partition 22 respectively. In this way, movement of the blade 68 will shear the ends of the slats S, against the support of the arcuate slat supports 70 and 72, thereby providing a clean cut on each slat end. The centre portion of the blade 68 moves in the same plane as the interior surface of the die plate 30. In this way the ends of all the blind components are trimmed in an even and symmetrical manner.

20 25 In order to move the blade support frame 60 to and fro, a connecting rod 74 is secured to the free end (left hand in Figures 4 and 5), of frame 60.

30 35 Connecting rod 74 may be powered or manual. Rod 74 is connected through a support block 76 to a rack 78 (Figure 7), and a drive gear 80. Drive gear 80 is connected to a manually operable lever 82 and moves to and fro in slots 81. Swinging of the lever 82 in the direction of the arrow B will cause the connecting rod 74 to drive the blade mounting frame 60 to the right (Figure 4 and 5) and reverse movement will cause reverse movement of the mounting frame 60.

END STOP ASSEMBLY

An adjustable end stop assembly 90 is provided as shown in Figure 8. A stop arm 92, is mounted on a slide bar 94. The slide bar 94 is slidable in a slide block 96, mounted on device 10.

An adjustable fastening screw 98 is provided on arm 92, and suitable indicia may be provided along the bar 94 so that arm may be adjusted to the correct position.

The slide bar 94 is slidable within block 96. It is operated by means of a curved linkage bar assembly 100. One end of the linkage bar assembly is secured to an axle rod 102 extending from hub 52.

A particular length of trim may be selected and the stop arm 92 may be moved to that length and secured by fastening screw 98.

The linkage bar 100 extends through opening 104 in bar 94, so that when bar 100 moves downwardly, bar 94 is driven to the left (Figure 8), and vice versa.

In certain cases, the thickness of the die plate 30 is greater than the length of the trim portion which is desired to cut off. The die plate may be provided with slotted recesses 110 and 112 (Figure 2), extending more or less horizontally and aligned with one another, from the headrail cut off recess 38 and the bottom rail cut off recess 40.

The end stop arm may be made thin as at 114 so that it will fit within the slots 110 and 112 and thus extend completely across the die plate 30 from the headrail cut off recess 38 to the bottom rail cut off recess 40. This will then permit the operator to set the stop arm 92, to provide an end trim of the blind, having a length which is shorter than the thickness of the die plate itself.

As also illustrated in Figures 8, and 9 and 10, it is possible to provide for operation of the blind slat cutting blade, in synchronism with the operation of the die plate for cutting the headrail and bottom rail. This may be achieved, by means of connecting the drive shaft 74 driving the blade assembly, by means of a cross bolt 120, to a lost motion

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linkage 122. Lost motion linkage 122 has a slotted opening 124 to receive bolt 120, thereby allowing the linkage 122 to move a predetermined distance, before it engages bolt 120.

5 The other end of linkage 122 is connected (Figures 9 and 10) to a connecting link 126. Connecting link 126 is connected within a slotted recess 128 in hub 52.

10 In this way when the arm 54 is swung toward the operator to rotate hub 52, so as to cut the headrail and bottom rail, a predetermined distance, swinging of the arm 54 a further distance will cause movement of the bolt 120, and connecting rod 74 thereby causing movement of the blade assembly for shearing the ends of the blind slats.

In this way a single manual movement can provide for cutting of all three components of a blind.

15 As explained on above cutting of the headrail takes place first, and the bottom rail is cut in sequence. This can also be achieved as shown in Figure 12. The die plate 30 can have a separate portion 30A, and lost motion links 130 connect it with die plate 30.

20 Cutting could also take place in other directions. Figure 13 for example illustrates cutting in a vertical direction. A main body 140 having headrail and bottom rail openings 142 and 144 is provided, similar to Figure 1. A transverse blind slat cutting assembly 146 generally similar to Figure 1 is also provided. However in order to shear the headrail and bottom rail, a vertical shear member 148 is provided, mounted in a transverse guide plate 150. A drive cam 152 is mounted to a rotatable hub (not shown) and drives the shear 148 in manner similar to the die cutting plate of Figure 1. In this case, however the movement is vertically, downwardly, and upwardly.

30 Plate 150 would have an opening 151 to receive the ends of the blind components.

35 A headrail shear blade 154 is provided is provided on one side of the shear member 148 and a bottom rail shear blade 156 is provided on the other side registering with the respective headrail and bottom rail openings 142 and 144.

Between the two shear blades there is a rectangular clearance space 158, the purposes of which is to fit around either side of the blind slat portion S, extending through the main body 140.

5 It will also be seen that in this embodiment, by the operation of the cam 152 the entire shear member 148 will be driven downwardly. This will cause the two shear blades 154 and 156 to cut the headrail and the bottom rail. After this, 10 the shear member 148 will be raised upwardly, and cutting of the blind slats S can then proceed in the manner already described above.

15 As illustrated in Figure 15, the invention may also be carried out using two separate manual controls, for cutting the blind components separately by separate manual operations.

20 In this case, a base plate 170 has a blind component holder member 172. Holder member 172 has an opening 174 to receive the headrail, and an opening 176 to receive the bottom rail. A cutting die plate 178 is of a similar design to that illustrated in the Figure 1 embodiment. It will also have suitable cutting openings (not shown) 25 registering with the headrail opening 174 and the bottom rail opening 176. It is operated by a cam 180 and an arm 182.

30 In this way, the headrail and the bottom rail of the blind may be cut by operation of the manual arm 172.

35 The blind slats in this case are supported in the blind slat openings 184,186, separated by the supporting partition 190, in which the slats are grouped in separate bundles. A cutting blade 192, is operated by means of rods 194 and 196, and wheel 198 and handle 200.

In this way, the cutting of the headrail and the bottom rail is made by one manual operation, and the cutting of the blind slats by another manual operation.

40 In some circumstances it is also desirable to be able to trim the width of a vertical blind. Typical vertical blinds have a headrail with control rods extending the length of the

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headrail. Runners within the headrail support a plurality of vertical slats in known manner.

In some cases at a point of sale a customer may require that the vertical blind be trimmed as to width.

5 This can be achieved by the modification shown in Figure 16. In this case the support body 202 is formed with a further generally U-shaped recess 204 which is shaped to receive the headrail of a vertical blind. Two control rod holes 206-206 are formed side by side, within the space enclosed by the 10 headrail recess 204. The cutting die plate 208, located on the other side of body 202, is provided with a matching cutting opening (not shown) and cutting holes (not shown) for cutting the vertical blind headrail and control rods.

15 Depending on the length of the headrail that is cut off, one or more runners and vertical blind slats (not shown) will also be removed by simply sliding them out of the open end of the headrail.

20 The foregoing is a description of a preferred embodiment of the invention which is given here by way of example only. The invention is not to be taken as limited to any of the specific features as described, but comprehends all such variations thereof as come within the scope of the appended claims.

CLAIMS:

1. An apparatus for trimming the width of blinds of the type having a plurality of components including a headrail (H), and a plurality of blind slats (S), each having a predetermined profile, and comprising;

5 support body means (14), said body means defining a headrail opening (16), and a bottom rail opening (20), and means defining blind slat opening means, respective said blind components being insertable into respective said openings;

10 die plate means (30) located alongside said support body;

cutting recess means (38,40) in said die plate means for cutting at least some of said components;

15 blind slat cutting means (68) for cutting said blind slats;

20 guide means (32,34) on said support body for movably supporting said die plate means, said guide means defining a predetermined movement axis, whereby said die plate can move relative to said headrail and bottom rail openings in said support body between two positions, a first position in which said support body openings and said die plate cutting recesses are in alignment with one another, and a second position in which said cutting recesses are out of alignment with said openings, whereby the cutting of said headrail, and said bottom rail will take place in the same plane, and,

25 means (50) for moving said die plate means, between said two positions.

30 2. An apparatus as claimed in Claim 1 wherein said headrail opening (16), and said bottom rail opening (18) in said support body and said blind slat opening means (20), are aligned along a common axis, and wherein said headrail cutting recess (38), and said bottom rail cutting recess (40) and said blind slat cutting means (68) are also aligned along a common axis.

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3. An apparatus as claimed in Claim 2 wherein both said axes are coincident and are horizontal, whereby to facilitate insertion of respective said blind components in respective said openings and recesses and passages.

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4. An apparatus as claimed in Claim 3 wherein said die plate movement axis is substantially diagonal to said axes of said headrail and said bottom rail openings and respective said recesses.

10

5. An apparatus as claimed in Claim 1 wherein said blind slat opening means (20) is adapted to receive said blind slats of said venetian blind, and including blind slat passage means (36) in said die plate means which is oversized relative to said blind slat opening means, whereby movement of said die plate means does not effect cutting of said blind slats.

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6. An apparatus as claimed in Claim 5 and including blind slat cutter blade means (68) mounted on said support body, and being movable relative to said blind slat opening means, whereby to cut said blind slats, upon movement of said blind slat cutter blade means.

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7. An apparatus as claimed in Claim 6 including blind slat support means (70) defining a predetermined profile, and mounted on said support body and wherein said blind slat cutter blade means (68) defines a corresponding predetermined profile, whereby said blind slats are trimmed in accordance with said predetermined profile.

25

8. An apparatus as claimed in Claim 5 and including blind slat cutter blade means (68) mounted on said support body, and being movable relative to said blind slat opening means, and partition means (22) in said blind slat opening means for separating said blind slats into groups whereby said groups

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of blind slats are cut in sequence, upon movement of said blind slat cutter blade means.

9. An apparatus as claimed in Claim 1 wherein said means (50) for moving said die plate means comprises a manually operable lever means (54), mounted in said support body, and transmission means (50) connecting said lever means with said die plate means for transmitting movement of said manual lever means thereto.

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10. An apparatus as claimed in Claim 1 and including a blind slat cutter manual lever means (82) mounted on said support body, and operable to cause movement of said blind slat cutting means.

15

11. An apparatus as claimed in Claim 1 including end stop means (114) adjacent said die plate means, for engaging the free ends of said blind components, whereby to define a predetermined length of cut in respect thereof.

20

12. An apparatus as claimed in Claim 11 including linkage means (100) connected to said end stop means and responsive to movement of said die plate means, whereby to move said end stop (114) means free of said die plate means, for clearing of trim portions of said blind.

25

13. An apparatus as claimed in Claim 8, and including linkage means (122,126) connecting said blind slat cutting means to said manually operable lever means whereby said die plate, and said slat cutting means may be moved, in sequence one after the other, by a single movement of said manually operable lever means (54).

30

14. An apparatus as claimed in Claim 1, and wherein said blind slat opening means is located between said headrail opening and said bottom rail opening in said support body, and wherein said blind slat passage in said die plate means

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is located between said headrail cutting recess and said bottom rail cutting recess in said die plate means, whereby to facilitate insertion of said blind components into said support body and said die plate means.

5

15. An apparatus as claimed in Claim 1 wherein said blind components are insertable through said support body from one side, and wherein said die plate means is located on the other side of said support body.

10

16. An apparatus as claimed in Claim 1 wherein said bottom rail cutting die defines a greater space than said headrail cutting die whereby said headrail and said bottom rail are cut in sequence one after the other.

15

17. An apparatus as claimed in Claim 1 wherein said die plate means (30) is of two part construction (30,30A) and including lost motion connection means (130) connecting said two parts, for movement in sequence.

20

18. An apparatus as claimed in Claim 1 and including a further headrail opening (204), and cutting recess and opening and cutting recesses for cutting control rods of a vertical blind.

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19. A method of trimming the width of venetian blinds of the type having a head rail, a plurality of slats and a bottom rail, said method comprising the steps of:

30 placing a selected end of said head rail and said bottom rail of said venetian blind through first corresponding head rail and bottom rail openings in a support body whereby at least said head rail and said bottom rail extend through respective ones of said first head rail and bottom rail openings;

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placing the same selected end of said head rail and said bottom rail through aligned second corresponding head rail and bottom rail openings in a cutting mechanism, and,

5 moving said cutting mechanism whereby said second corresponding head rail and bottom rail openings move out of alignment with said first corresponding head rail and bottom rail openings so that the force exerted by the relative movement of said cutting mechanism and said support body results in cutting of the selected end of said head rail and bottom rail.

10 20. The method of Claim 19 further comprising the steps of placing the same selected end of said plurality of slats through a blind slat opening in said support body and through an aligned blind slat passage in said cutting mechanism; and cutting said plurality of slats upon movement of said cutting mechanism from a first position to a second position.

15 21. The method of Claim 19 wherein said step of moving said cutting mechanism includes actuating a rotary cam mechanism to obtain successive cutting of said selected end of said head rail and said bottom rail.

20 22. The method of Claim 19 wherein said step of actuating said rotary cam mechanism also obtains cutting of said selected end of said plurality of slats.

25 23. The method of Claim 19 wherein after said selected end of said head rail and said bottom rail are cut, placing the uncut other end of said head rail and said bottom rail of said venetian blind through said first corresponding head rail and bottom rail openings in said support body whereby at least said head rail and said bottom rail of said uncut other end extend through respective ones of said first head rail and bottom rail openings; placing the same uncut end of said head rail and said bottom rail through said aligned second corresponding head rail and bottom rail openings in said cutting mechanism; and moving said cutting mechanism whereby said second corresponding head rail and bottom rail openings move out of alignment with said first

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corresponding head rail and bottom rail openings so that the force exerted by the relative movement of said cutting mechanism and said support body results in cutting of the previously uncut other end of said head rail and bottom rail.

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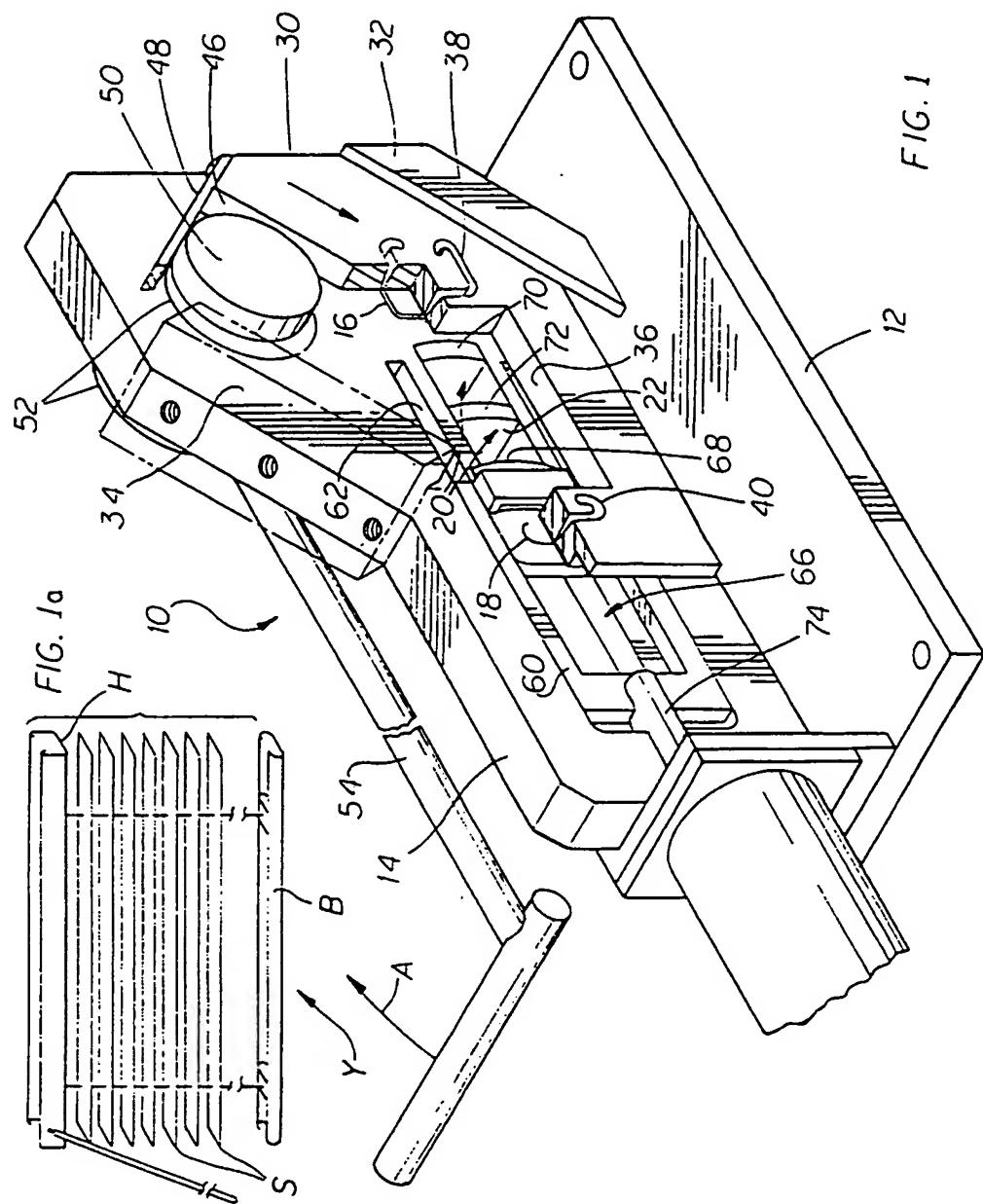
24. The method of Claim 23 further comprising the steps of placing the uncut other end of said plurality of slats through said bind slat opening in said support body and through said aligned blind slat passage in said cutting mechanism; and cutting said previously uncut other end of said plurality of slats upon movement of said cutting mechanism from a first position to a second position.

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25. The method of Claim 23 further comprising the step of cutting a substantially equal amount of material from both ends of said venetian blind so that the final cut venetian blind has a symmetrical appearance.

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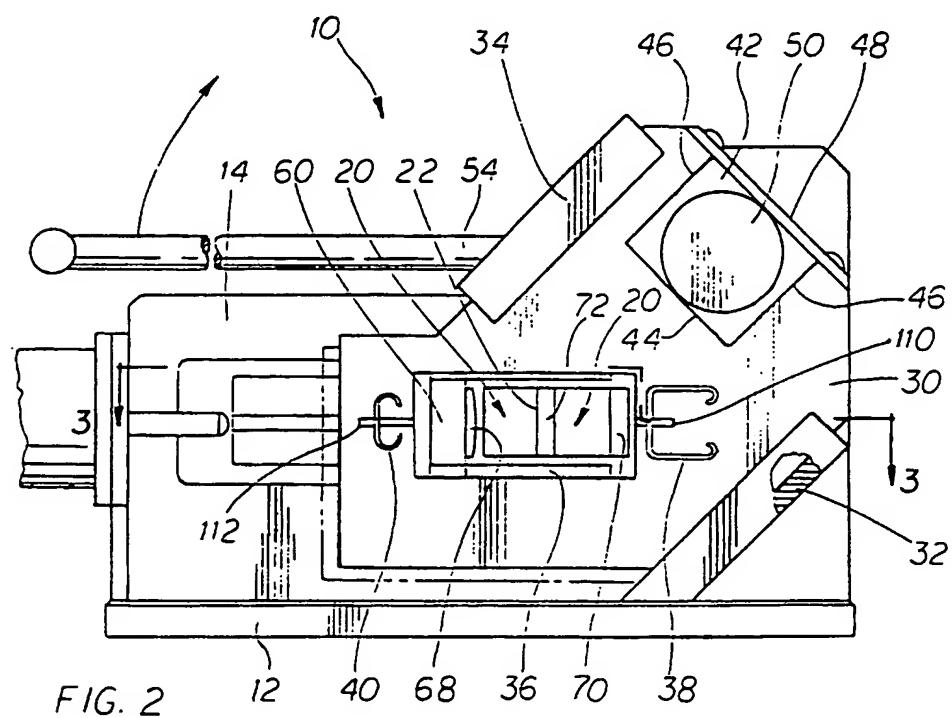


FIG. 2

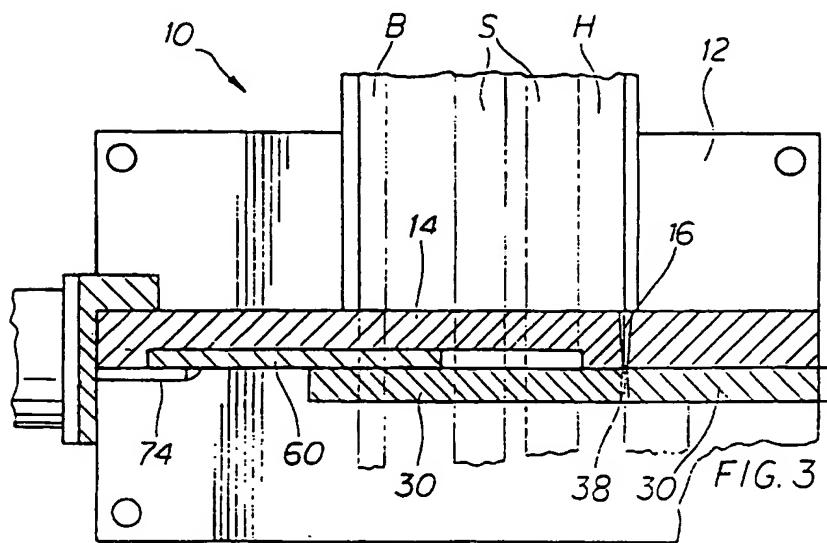
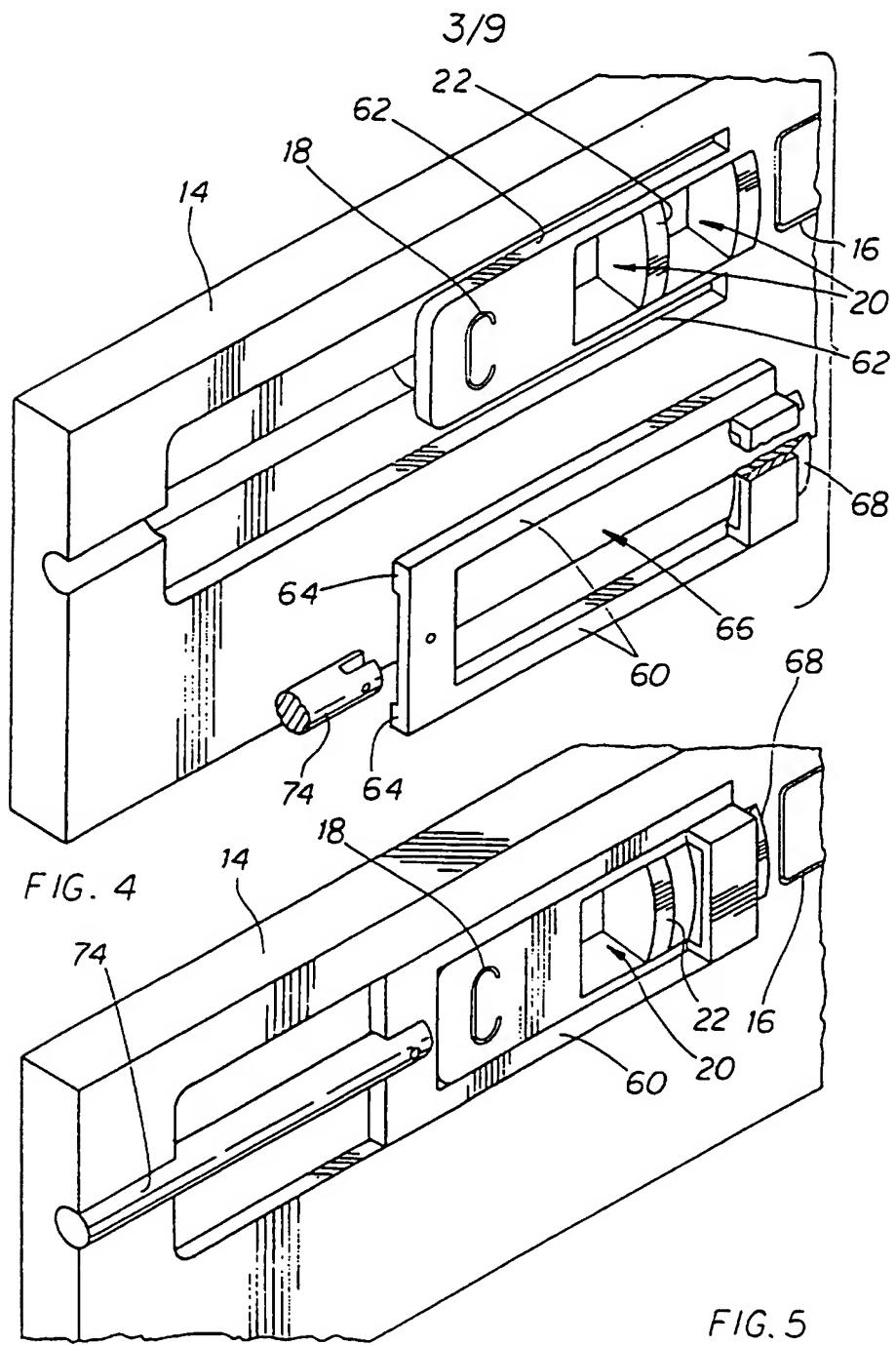
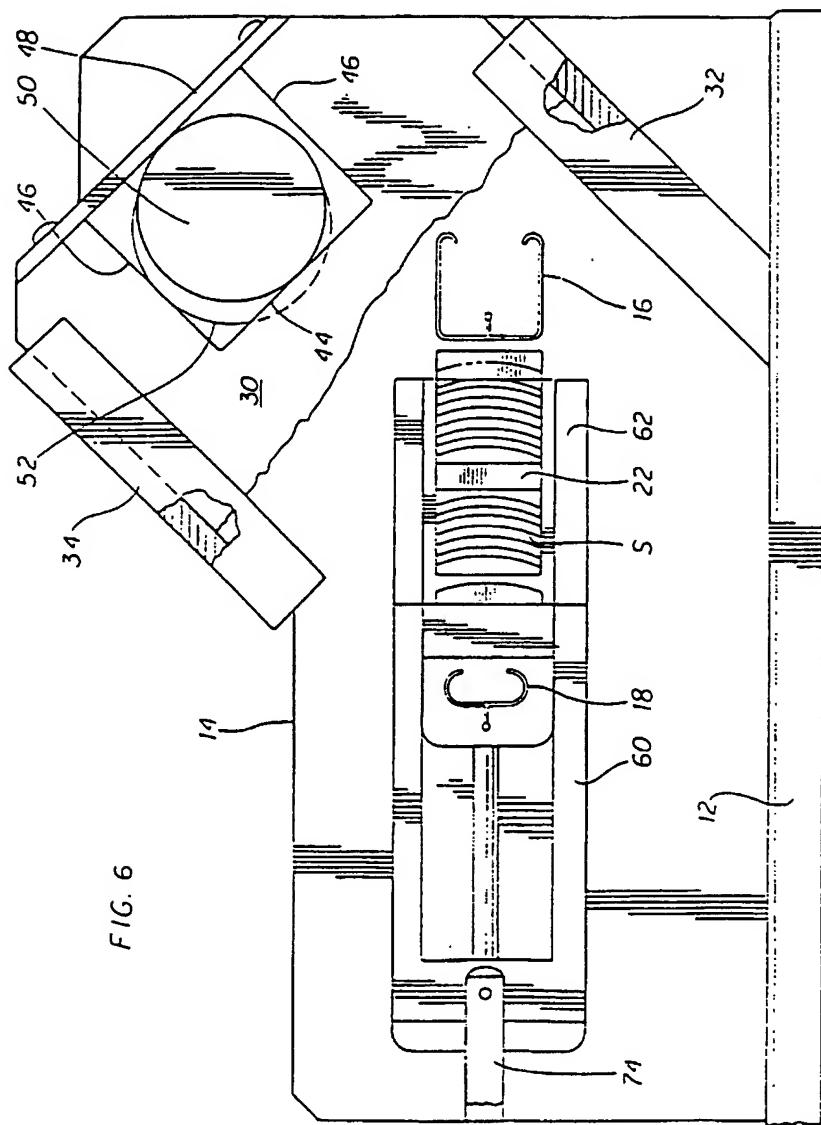


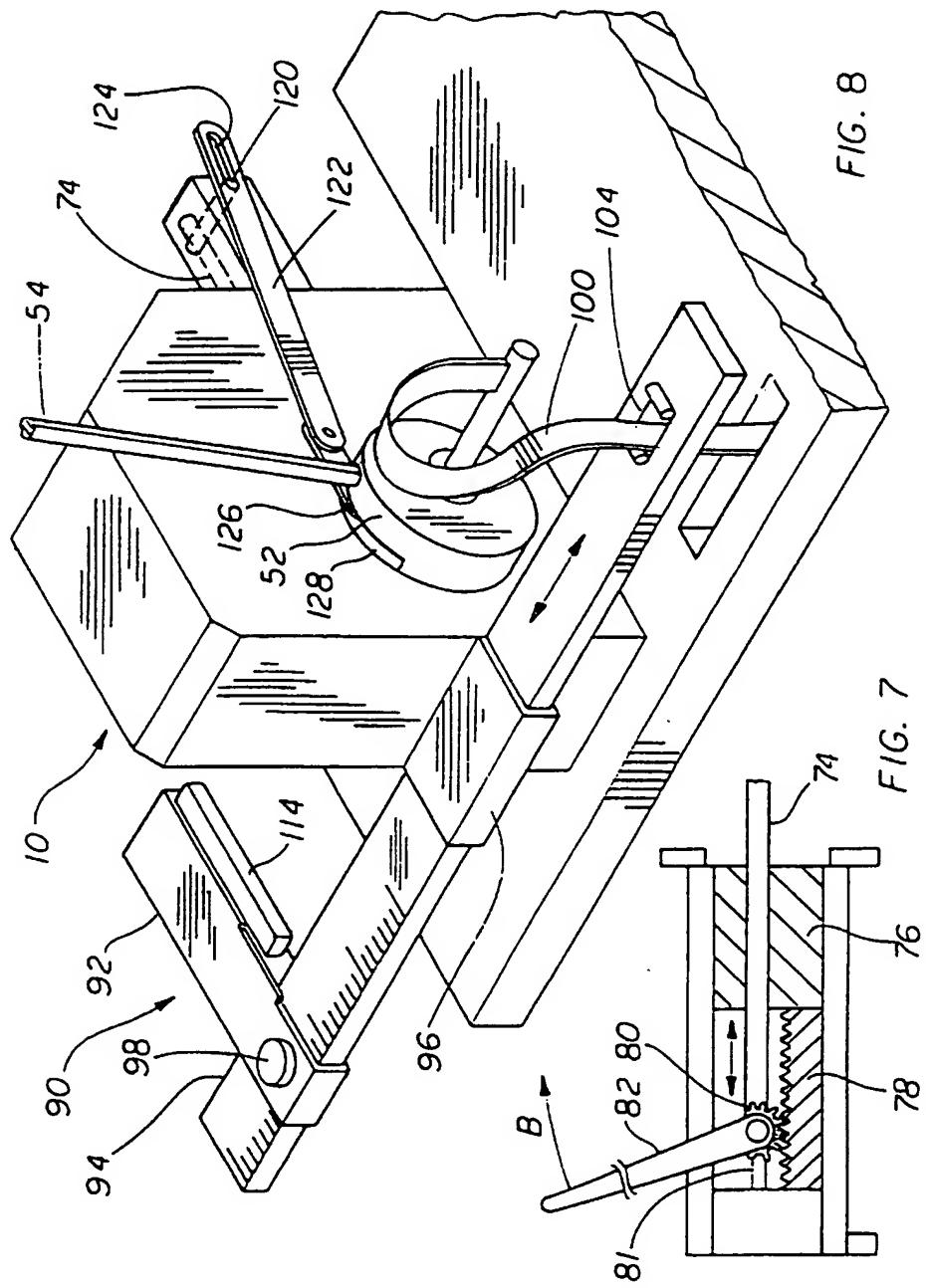
FIG. 3

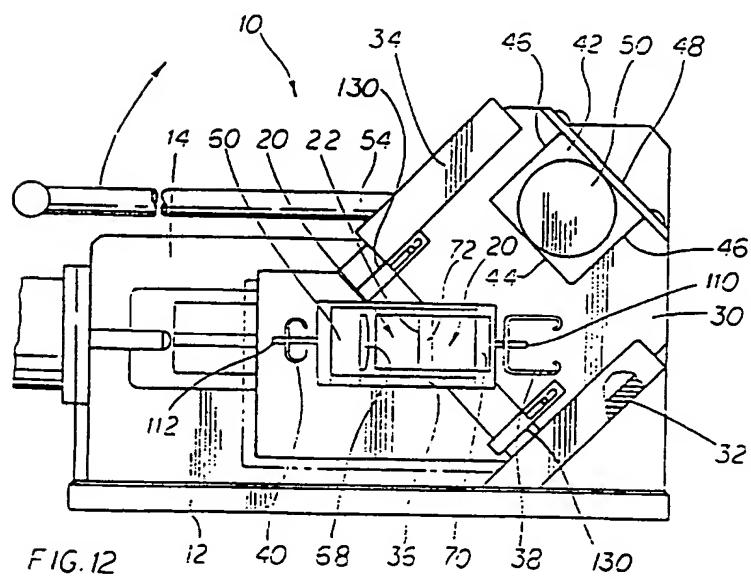
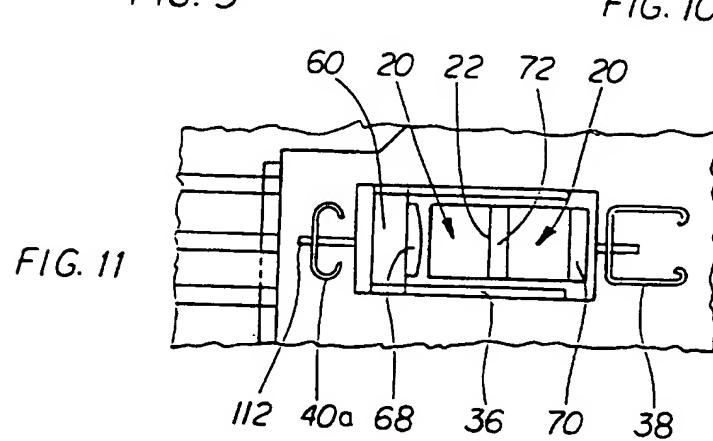
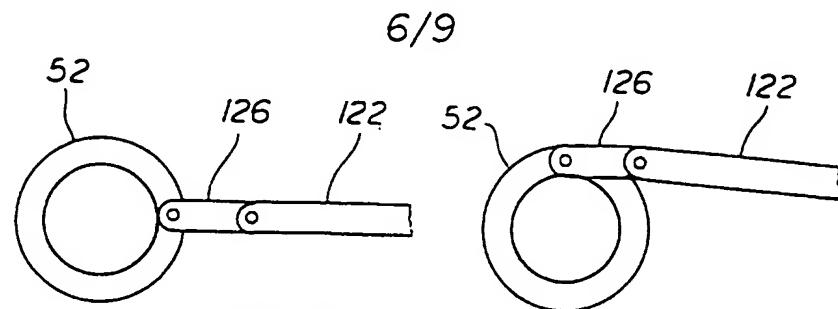


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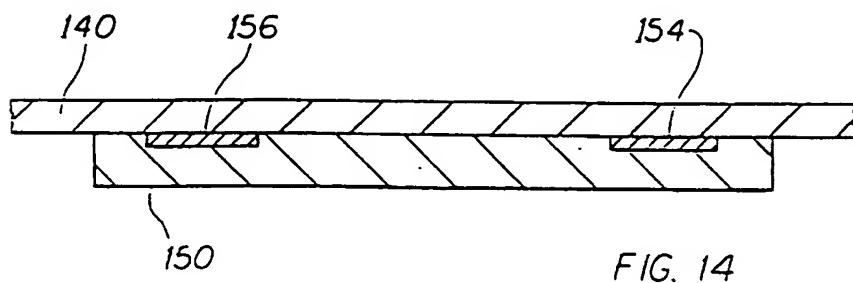
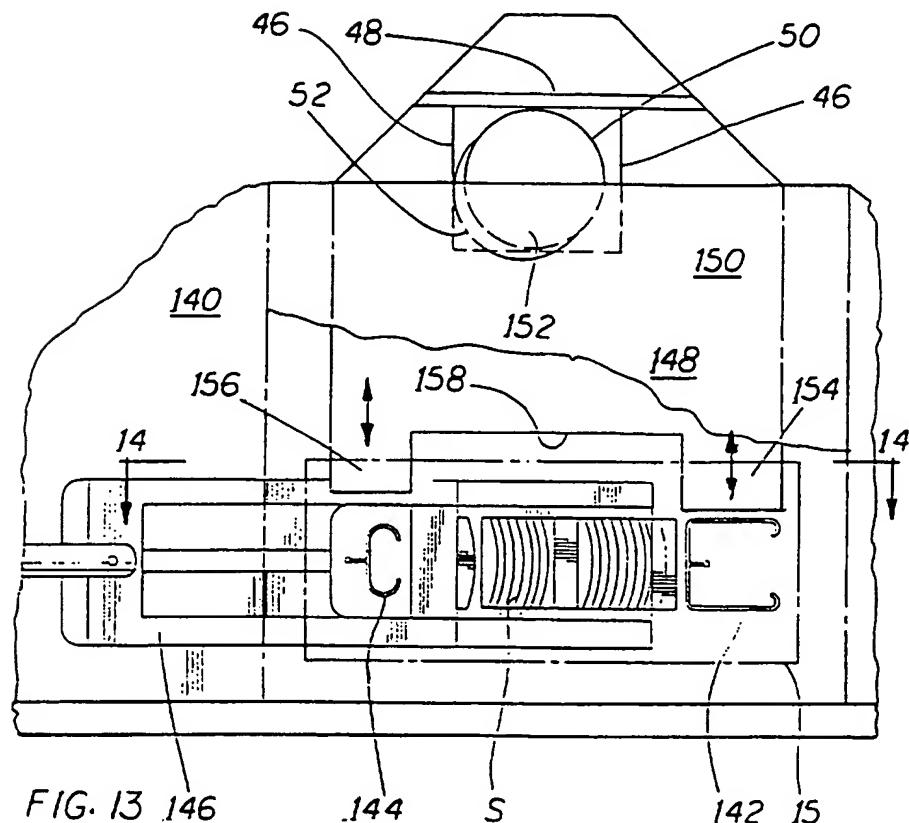


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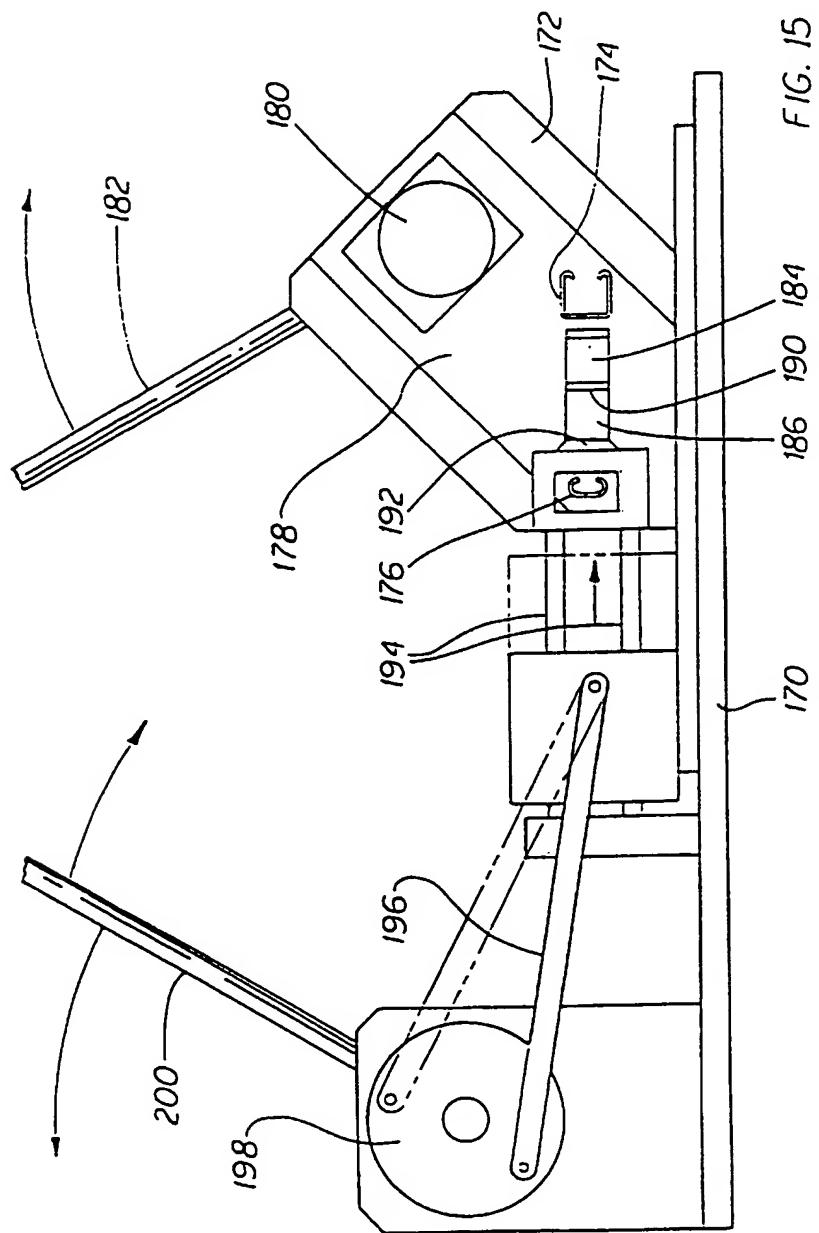




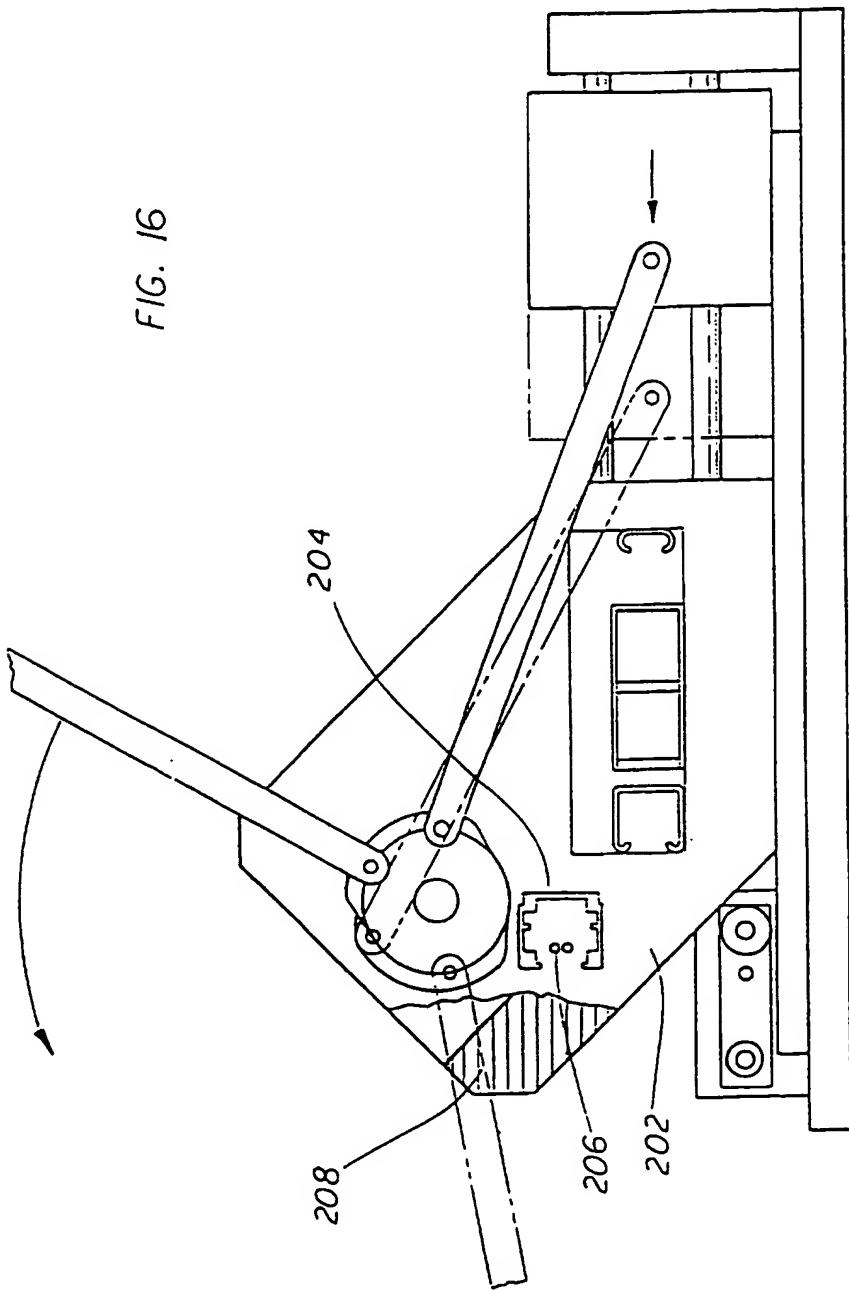
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INTERNATIONAL SEARCH REPORT

In National Application No
PCT/CA 96/00594

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E06B9/266

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>EP,A,0 615 050 (NEWELL OPERATING COMPANY) 14 September 1994</p> <p>see column 3, line 20 - column 12, line 22; figures 1-11</p> <p>---</p> <p>GB,A,2 248 869 (NEWELL OPERATING COMPANY) 22 April 1992</p> <p>see the whole document</p> <p>---</p> <p>WO,A,92 17676 (MAROCO, N. ET AL.) 15 October 1992</p> <p>see the whole document</p> <p>-----</p>	1-3,6, 9-12,14, 19-25
A		
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

Date of mailing of the international search report

19 November 1996

17.12.96

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Int'l. Application No

PCT/CA 96/00594

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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		CA-A-	2114097	23-08-94
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